

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

Overall Expectation #1:

- describe, extend, and create a variety of numeric patterns and geometric patterns

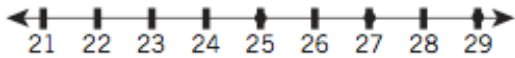
Spring 2006

- 6** Kevin is making a number pattern by repeating the first three numbers he writes in the same order.

Which of the following could be Kevin's pattern?

- ☐ 2, 4, 6, 2, 4, 6, 2, ... *
- ☐ 2, 4, 6, 8, 10, 12, 14, ...
- ☐ 2, 4, 2, 4, 2, 4, 2, ...
- ☐ 2, 2, 4, 4, 6, 6, 2, ...

- 26** Beverly counts by 2s to mark points on the number line shown.



Which two numbers before 25 should Beverly mark with points?

- ☐ 21 and 22
- ☐ 21 and 23 *
- ☐ 22 and 24
- ☐ 23 and 24

- 21** Nalini is using the rule “add 4” to shade numbers on the hundreds chart shown. She starts her pattern with the number 3.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

The pattern continues in the same way. What number will Nalini shade on the chart next?

- ☐ 45
- ☐ 47 *
- ☐ 49
- ☐ 51

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- 8** Chitra makes the following number pattern using a rule. The pattern continues in the same way.

5, 9, 13, 17, 21, 25, 29, . . .

Use the list below to create another number pattern.

- Use Chitra's pattern rule.
- Start with the number 6.
- Include 5 more numbers in your pattern.

Describe the rule Chitra used to make her pattern.

My number pattern is 6, _____, _____, _____, _____, _____.

- 19** The picture below shows figures Jen forms using pencils. She begins with Figure 1 and continues until she finishes Figure 5.



Figure 1



Figure 2

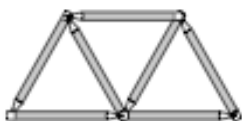


Figure 3

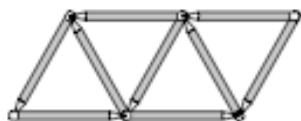


Figure 4

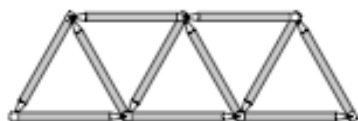


Figure 5

Which sequence below represents the number of pencils Jen uses for each figure in the picture?

- ☐ 1, 2, 3, 4, 5
- ☐ 3, 5, 7, 9, 11
- ☐ 3, 6, 9, 12, 15
- ☐ 5, 4, 3, 2, 1

- 35** Kim is making a pattern using a triangle shape, as shown below.



Which two attributes does Kim change to make this pattern?

- ☐ size and direction
- ☐ number and colour
- ☐ size and shape
- ☐ direction and number

- 36** The following number pattern shows how the number of magnets in Sabrina's collection has increased over a four-month period.

4, 10, 16, 22, ...

The number of magnets continues to increase by 6 each month. What will be the total number of magnets in Sabrina's collection next month?

- ☐ 6
- ☐ 14
- ☐ 28
- ☐ 29

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- 28** Mrs. Anton is buying packages of pencils for her class. A store advertises that every shopper will receive 1 free package of pencils for every 2 packages purchased.

Packages of Pencils

Number Purchased	Packages of Free Packages
2	1
3	1
4	2

Based on the pattern shown in the chart, what is the least number of packages of pencils Mrs. Anton must purchase to receive 5 free packages?

Justify your answer.

Mrs. Anton must purchase at least _____ packages of pencils to receive 5 free packages.

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Spring 2008

- 5** Mari is using a rule to make the number pattern shown below.

567, 571, 575, 579, . . .

Which of the following patterns could use the same rule?

- ☐ 892, 888, 884, 880
- ☐ 893, 897, 903, 904
- ☐ 894, 898, 902, 906
- ☐ 895, 900, 905, 910

- 19** A repeating geometric pattern is shown below.

•▲□|•▲□|•▲□|•_____

Which of the following completes the pattern?

- ☐ •▲□|
- ☐ ▲□|•
- ☐ □▲•|
- ☐ |▲•□

- 13** Starting on July 2nd, Tim washes dishes every 4th day in July. He shades the dates he washes dishes on the calendar.

Which calendar shows the dates shaded correctly?

☐

July						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

☐

July						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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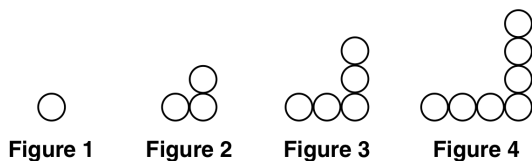
July						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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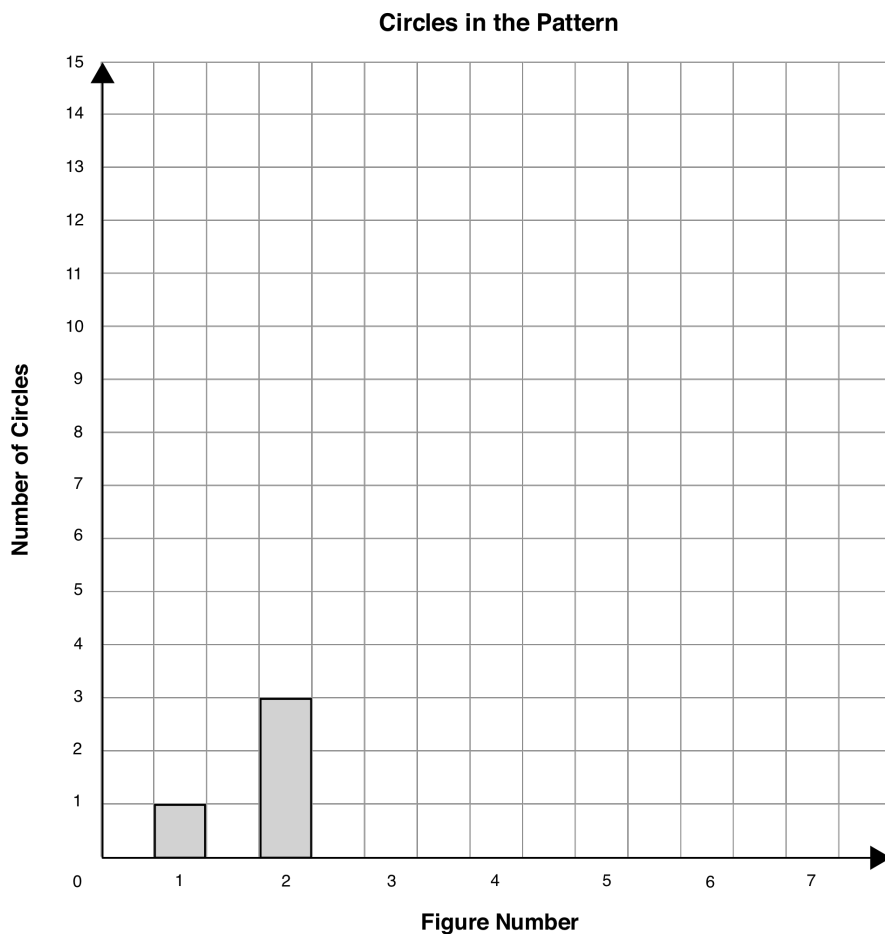
July						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

7 The first four figures in a pattern are shown below.



Complete the bar graph below to represent the number of circles in each figure.



How many circles will there be in Figure 7?

Explain your thinking.

There will be _____ circles in Figure 7.

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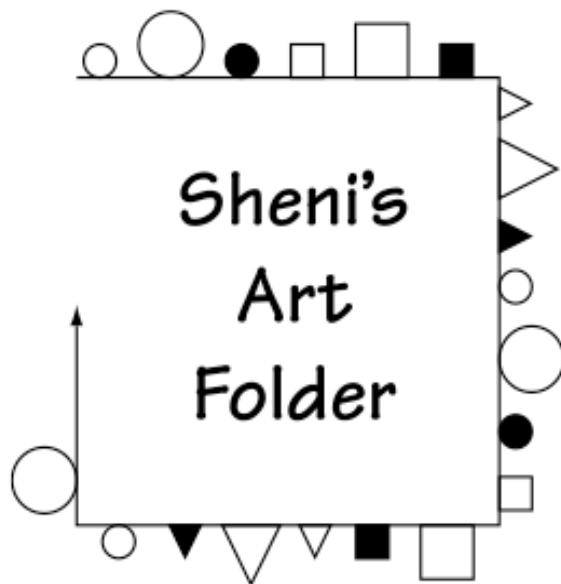
Spring 2009

5 An increasing pattern is shown. What are the next four terms in the pattern?

















1, 14, 27, 40, 53, __, __, __, __

- ☐ 66, 79, 92, 105
- ☐ 66, 80, 93, 107
- ☐ 67, 80, 93, 106
- ☐ 67, 82, 96, 111

19 Sheni makes a pattern around the edge of her art folder.



What are the next 3 shapes in Sheni's pattern?

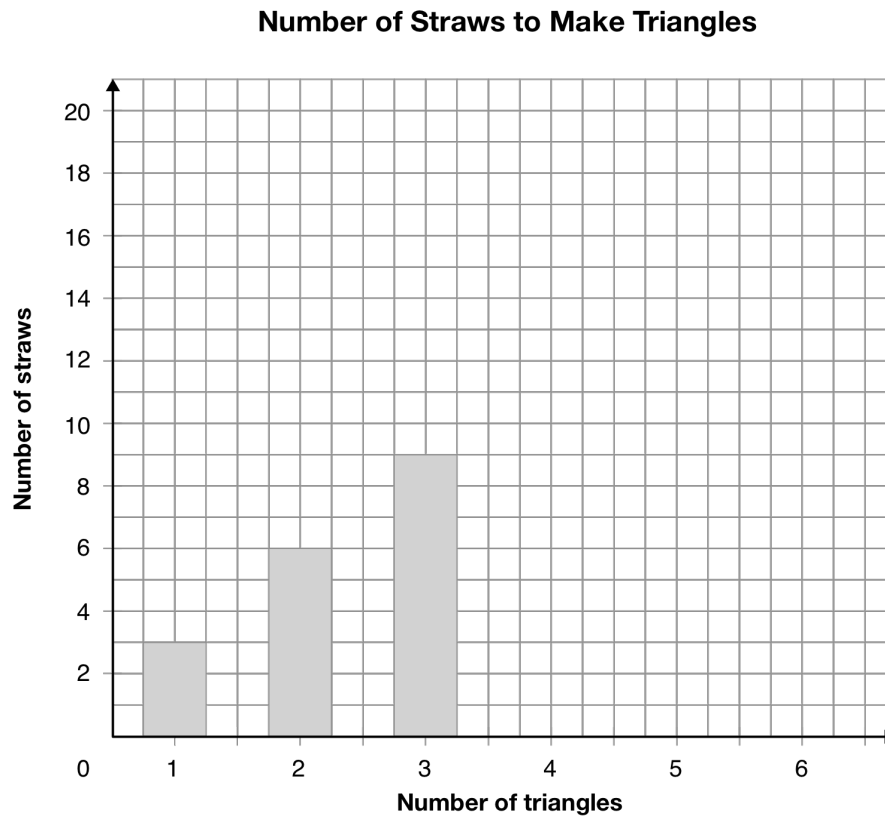
- ☐    
- ☐    
- ☐    
- ☐    

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7 Sally is making triangles using straws.

EQAO2014

She creates a bar graph to show how many straws she needs to make triangles.



Complete the graph to show the number of straws for 4, 5 and 6 triangles.

How many straws will Sally need to make 8 triangles?

Justify your answer.

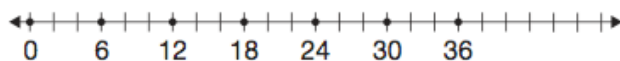
2 Look at the following pattern.

9, 12, 15, 18, ...

If this pattern continues, what will the next three numbers be?

- ☐ 20, 22, 24
- ☐ 20, 23, 26
- ☐ 21, 23, 25
- ☐ 21, 24, 27

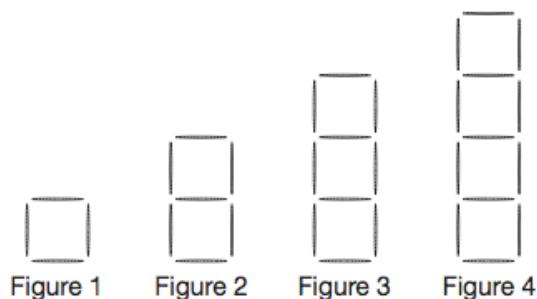
32 Look at the pattern marked on the number line below.



Which of the following patterns uses the same pattern rule?

- ☐ 3, 6, 9, 12
- ☐ 3, 9, 15, 21
- ☐ 6, 11, 16, 21
- ☐ 6, 12, 24, 48

18 Horatio uses toothpicks to create the pattern below.



What number pattern describes the number of toothpicks that Horatio uses?

- ☐ 4, 8, 12, 16
- ☐ 4, 7, 10, 13
- ☐ 1, 4, 7, 10
- ☐ 1, 2, 3, 4

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

27 Juanita shades a growing number pattern on the chart below.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50

Complete the chart using Juanita's pattern rule.

What is Juanita's pattern rule?

Pattern rule: _____.

Complete the number pattern below using Juanita's pattern rule.

11, __, __, __, __

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

Overall Expectation #2:

- demonstrate an understanding of equality between pairs of expressions, using addition and subtraction of one- and two-digit numbers

Spring 2006

- 7** Chloe wants to solve the number sentence shown.

$$23 - 6 = \square$$

Which of the following number sentences could Chloe use to check her answer?

- ☐ $26 - 3 = 23$
- ☐ $23 + 6 = 29$
- ☐ $17 - 6 = 11$
- ☐ $17 + 6 = 23$ *

- 16** Which addition sentence is related to $16 - 5 = 11$?

- ☐ $16 + 5 = 21$
- ☐ $5 + 11 = 16$ *
- ☐ $6 + 5 = 11$
- ☐ $11 + 16 = 27$

- 22** Which number can be placed in the box to make this number sentence true?

$$183 + \square = 200$$

- ☐ 393
- ☐ 383
- ☐ 27
- ☐ 17 *

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

Spring 2007

1 A number sentence is shown below.

$$83 - \square = 65$$

What number should be placed in the box to make this number sentence true?

- ☐ 151
- ☐ 27
- ☐ 22
- ☐ 18

6 A number sentence is shown below.

$$82 - 17 = 39 + \square$$

Which number should be placed in the box to complete this number sentence correctly?

- ☐ 26
- ☐ 36
- ☐ 65
- ☐ 75

18 The two number sentences below belong to a fact family.

$$7 + 5 = 12$$

$$12 - 5 = 7$$

Which of the following pairs of number sentences belong to the same fact family?

- ☐ $7 + 12 = 19$
 $17 - 5 = 12$
- ☐ $12 + 5 = 17$
 $7 - 5 = 2$
- ☐ $5 + 7 = 12$
 $12 - 7 = 5$
- ☐ $5 + 7 = 12$
 $7 - 5 = 2$

GRADE THREE EQAO QUESTIONS: Patterning and Algebra

Spring 2008

3 Which equation below is correct?

- ☐ $8 + 16 = 8 + 4 + 13$
- ☐ $8 + 16 = 8 + 3 + 13$
- ☐ $8 + 16 = 8 + 6 + 13$
- ☐ $8 + 16 = 8 + 7 + 13$

4 What number goes in the box to make the number sentence true?

$$33 - \square = 7$$

- ☐ 22
- ☐ 24
- ☐ 25
- ☐ 26

20 Wayne is solving the addition problem shown below.

$$16 + 7 = \square$$

He breaks 7 apart into two numbers. He adds one number to 16 to make 20.

What is the other number that needs to be added to 20 to solve the problem?

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 7

3 In which box can 6 be placed to make the equation true?

- ☐ $30 - 4 = 18 + \square$
- ☐ $30 - 4 = 19 + \square$
- ☐ $30 - 4 = 20 + \square$
- ☐ $30 - 4 = 21 + \square$

12 What number correctly completes the number sentence below?

$$\square \times 6 = 6$$

- ☐ 36
- ☐ 6
- ☐ 1
- ☐ 0

20 Joseph adds $63 + 17$ in his head. Which of the following will give Joseph the same answer?

- ☐ $60 + 10 + 7$
- ☐ $60 + 20 + 10$
- ☐ $60 + 10 + 7 + 3$
- ☐ $60 + 10 + 10 + 3$

33 What number can be placed in both boxes to make the following expressions have the same value?

$$\square \times 7$$

$$\square \times 6$$

- ☐ 7
- ☐ 6
- ☐ 1
- ☐ 0

- 5** Which number completes the following number sentence?

$$24 - \square = 17 + 3$$

- ☐ 3
- ☐ 4
- ☐ 6
- ☐ 7

- 19** Look at the number sentence below.

$$23 + 18 = \square$$

Which of the following could be put in the box to make the number sentence true?

- ☐ $20 + 1 + 20$
- ☐ $20 + 3 + 20$
- ☐ $20 + 2 + 20$
- ☐ $20 + 4 + 20$

- 11** Marty solves the following question.

$$65 - 28 = 37$$

Which number sentence would help Marty check his answer?

- ☐ $65 + 28 = 93$
- ☐ $37 - 28 = 9$
- ☐ $93 - 65 = 28$
- ☐ $37 + 28 = 65$